3-15-2013

Design For The High School Experience

Richard L. Beckman

R.I.T

Design For The High School Experience

by

Richard L. Beckman

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Fine Arts

School of Industrial Design
College of Imaging Arts and Sciences

Rochester Institute of Technology
Rochester, NY
March 15th, 2013

COMMITTEE APPROVAL

DAVID MORGAN	**3 . 31 . 14**
DAVID MORGAN	**DATE**

GRADUATE DIRECTOR/ THESIS ADVISOR

ALEX BITTERMAN	**5. 31. 13**
ALEX BITTERMAN	**DATE**

COMMITTEE MEMBER/OBSERVER/ASSOCIATE ADVISOR

ABSTRACT

The purpose of this thesis is to allow teachers in high schools to have a resource for creative thinking to help aid their classrooms in design based education for their students.

I started this journey with two questions:
'How can I help educate others about the world of design?'
'How can I show other educators outside of the design field that design education is needed now more than ever?'

The first question was answered in part by me enrolling at RIT's Industrial Design Program. At the end of my first year at RIT I was given the opportunity from the Industrial Design Graduate Program Director to teach a class of around 20-25 freshmen concerning issues pertaining to Industrial Design. I taught the class by focusing on contemporary issues, utilized multiple mediums, and discussing concepts that allowed students to manipulate, interact with, discuss, and relate to assignments like they never had before.

The second lead me down a path that examined education – one that caused me to think about where design education is in society today and where it can more rightly fit in someone's educational upbringing. I wanted to create a series of design-focused lessons for students in which teachers could implement easily into their classrooms, thus cross-pollinating their students education through the medium of design.

KEY WORDS

Design, Industrial Design, Education, Pedagogy, Art, Experience, Semiotics, Manufacturing, Discussion, Multi/Cross Curriculum, High School

OVERVIEW

It is my hope that teachers in high school settings, regardless of their particular teaching practice, can use any or all of the segments in this document to engage their students in design based learning, critical thinking, outside the box ideas, and put a newer spin on lessons that already exist. This document peers into a college freshman classroom and discusses the various design assignments created, assignment outcomes, and how the assignments might be integrated and relate to teachings that other classrooms in high schools are already using. I understand that teaching is organic and cannot always be segregated into perfect instructional segments, therefore it is my hope that this document will in some small way help enable teachers to implement various levels of design based education into their classrooms.

The 'Classroom Creation' portion of this document is intended to show various schools and institutes that foster for the same type of design based education that I am striving toward. The places and people mentioned are there to help guide and be used as resources for inspiration.

The 'Design Assignments' section has been created to help teachers to instill design based thinking and practices into their classrooms – to take a subject and go from simple design discussion to a more in-depth lesson or assignment if desired. The various design segments and their corresponding assignments are as follows:

Design Discussions:
General Design Readings – Forum and lecture style discussion
Other Discussion Mediums
Research and Design

Art Implementation:

- Re– design Assignments
- Metaphor Design
- Junk Band
- Lighting up a Space

People Problem*:* Creating an understanding of how we relate to what we own

- Experience Experiment
- Steve and Shelly

Manufacturing*:* Creation and implementation of product

- Snowboard Manufacturing

Each of these segments will be broken into smaller subsections containing the following:

1. An introduction about each overall topic (i.e. art implementation, people problems, etc.),
2. A description about each design assignment
3. Examples from my class
4. Outcomes
5. Comments and suggestions as to how the assignments may apply to a high school classroom and which area of learning the design based assignment best suits.

FIGURES

Figure 17 Beckman, Richard. "Students in Class 3." Digital Image, (2008).

Figure 18 Beckman, Richard. "Student Work 1." Digital Image, (2008).

Figure 19 Mayer, Thomas. "gehry_sketches_intro_photo.jpg." Image. 2012. http://www.arcspace.com/the-architects-studio/frank-o-gehry-sketches/ (accessed March, 2014).

Figure 20 Beckman, Richard. "Student Work 2." Digital Image, (2008).

Figure 21 Beckman, Richard. "Student Work 3." Digital Image, (2008).

Figure 22 Beckman, Richard. "Student Work 4." Digital Image, (2008).

Figure 23 Beckman, Richard. "Student Work 5." Digital Image, (2008).

Figure 24 Beckman, Richard. "Student Work 6." Digital Image, (2008).

Figure 25 Beckman, Richard. "Students in Class 4." Digital Image, (2008).

Figure 26 Beckman, Richard. "Student Work 7." Digital Image, (2008).

Figure 27 Beckman, Richard. "Student Work 8." Digital Image, (2008).

Figure 28 Beckman, Richard. "Student Work 9." Digital Image, (2008).

Figure 29 Beckman, Richard. "Student Work 10." Digital Image, (2008).

Figure 30 Beckman, Richard. "Students in Class 5." Digital Image, (2008).

Figure 31 Beckman, Richard. "Students in Class 6." Digital Image, (2008).

Figure 32 Beckman, Richard. "Students in Class 7." Digital Image, (2008).

Figure 33 Beckman, Richard. "Students in Class 8." Digital Image, (2008).

Figure 34 Beckman, Richard. "Student Work 11." Digital Image, (2008).

Figure 35 Beckman, Richard. "Assignment Chart." Digital Image, (2009).

Figure 36 Beckman, Richard. "Student Work 12." Digital Image, (2009).

Figure 37 Beckman, Richard. "Student Work 13." Digital Image, (2009).

Figure 38 Beckman, Richard. "Student Work 14." Digital Image, (2009).

Figure 39 Beckman, Richard. "Student Work 15." Digital Image, (2009).

Figure 40 Beckman, Richard. "Student Work 16." Digital Image, (2009).

CLASSROOM CREATION

Introduction

Whitney Houston coined a phrase in 1985 when she wrote her pop hit *Greatest Love of All* and said, "I believe that children are our future. Teach them well and let them lead the way." Those simple and meaningful words say a lot about where our priorities should be focused as a society that prides itself on education. By believing that the children are our future we will focus more on what we need to do to create a world that is different from how it is today. Through thoughtful and provoking educational curriculums and programs we can change the future; making it a better place to live, love, and be happy.

My plan was to create a classroom setting that enables students to share experiences, learn about how things relate to each other, create new ideas, and explore new areas of study in different ways. And though there are many different types of schools, programs, and workshops there are minimal amounts of integrative programs, means of personal exploration, and creative outlets that allow students to synthesize their education and lives. In other words, there are little to no means of how to show a student how things relate to the bigger picture. It is my belief that through design education and programs that integrate design think and strategy found in collegiate design schools, teachers will be able to help mold a well-rounded and thoughtful group of children that will become better worldly citizens, and will therefore create a better future for us all.

Before I was given the opportunity to teach in a classroom at all, I began by researching various schools (collegiate and not), mentors (education gurus), and teaching techniques (developing my pedagogy). In conjunction with researching educational facilities, I found that the concept of design and the teachings surrounding a design related curriculum were almost non-existent in high school settings. If some of the concepts encapsulating design were there, then it was the word design that had become mottled, lost in translation, and used in ways that is not in line with what I have come to know in my own design based education. It seemed that most public high schools use the word design as a descriptor for creation, and though that thought process is mildly correct, the process of designing, the speak of design, and the thought processes to conceive design are much different.

On the whole, I had found that the term 'design' had become more popular but less understood. From superstores spouting their newly designed furniture to cell phone companies projecting their newest phones, I found that design had become a misunderstood word that needed attention and clarification. This desire to help create clarity drove me to produce these lessons, to help aid in truly understanding design, and to help people also come to the conclusion that design surrounds us all in various forms and therefore needs to be better understood to make wise decisions.

These findings led me to ask the question: How can we as consumers of these designed based goods not have a true understanding of what design really is? The answer I found lay within the walls of education. By denying people at a younger age the understanding, even on a basic level, of what design truly is all about, I have found generations of

people misinformed about what design is and how it truly is involved in their lives. By educating people about design and implementing design into peoples' lives there will hopefully be a revelation on how they interact daily with design, how they can design things for themselves, how they fuel a system that thrives on design, and how they can hopefully create a better world to live in through design.

CLASSROOM CREATION –

DESIGN EDUCATION

Introduction

These assignments and projects started out of the necessity for understanding design and its implications in daily life. I have always been an advocate for creating learning situations that extend beyond the walls of the classroom to situations in the "real world". I knew that I wanted to be able to show people that learning did not have to be about memorization from slide presentations or reciting facts from a book - I want people to have an opportunity to explore, understand, analyze, and expound upon events and activities that are contained within our own lives. I also knew that with these educational ideals in mind, attacking the problems at hand would be better suited by discussing these ideas with people at a younger age – more specifically high school.

The following information is about my own design education and information that I have gathered pertaining to current design schools of which have a great influence on the world of design and design education. This information is to be used to help inform, inspire, and be used as reference for those wishing to implement design education into their curriculums.

CLASSROOM CREATION –

DESIGN EDUCATION

Institutes, Schools, and Programs

These next few pages discuss findings concerning various educational institutes, schools, and programs concerning design and their involvement therein. Before deciding on creating assignments and projects that can potentially integrate design education with a standard high school curriculum, I started to look at how education, specifically design education, was already being used. During the investigation programs and institutions that fostered for educating students in the same manor that I envisioned emerged. The selections made here within are not entirely focused on design for design's sake, but rather the messages, philosophies, and missions of these educational facilities are centered on how design influences us in a bigger and broader way. These places of learning are more in line with a way of thinking that takes into consideration the future of not only education, but also our world.

CLASSROOM CREATION –

DESIGN EDUCATION

Institutes, Schools, and Programs

The Bauhaus

FIGURE 1

If you are currently involved in the arts, design, or the architectural world in some way, then the Bauhaus has infiltrated the way in which you have been taught. Since its inception it has produced multiple design movements, educational theorem, and forever changed the face of Design. Famous modern art movements and innovations in Furniture Design, Industrial Design, Graphic Design, and Architecture all spawned from this institute.

The Bauhaus, or architecture house, was founded in Germany by Walter Gropius in 1919 and was shut down by the Nazi party in 1933 at which time many of the instructors fled to America to help found a new Bauhaus that helped change the face of American art programs. The Bauhaus was originally founded as a modern art school but because of its teachings, activities, and focus on design based creation, it quickly became known as a school of design (Wick, 15).

At the fundamental level, the Bauhaus and the educators who worked there, fostered for a learning environment that was structured but open to explore and create freely. They created a mentoring program much like a trade school that allowed apprenticing other senior classmates and faculty, learning from and educating younger designers and artisans on one another's projects and skills. Though the Bauhaus has gone through many changes, the teachings there have "occupied a prominent place in the public consciousness as a seed for the crystallization of a new practice of art and culture of from, indeed, as a new blueprint for existence, or at least as an attempt to 'give order to life'" (Wick, 11).

CLASSROOM CREATION –

DESIGN EDUCATION

Institutes, Schools, and Programs

Rochester Institute of Technology – RIT

FIGURE 2

Much like the Bauhaus, Rochester Institute of Technology's (RIT) College of Imaging Arts and Sciences (CIAS) creates learning opportunities for students to not only reach outside the walls of the institute but also be grounded on the same belief that "each program in the school enables students to work alongside faculty members to form an inquisitive and dynamic educational community in which creativity, critical thinking, innovative problem-solving, professionalism, aesthetic understanding, cross-disciplinary study, and social responsibility are explored, cultivated, and promoted." (Website, RIT CIAS). This institute has been named one of the top design schools in the nation in various design practices and has continued to create students that are willing and able to make changes in the world. The faculty and staff at RIT understand that true education comes from places other than just textbooks and lectures, they strive to act accordingly within their own teaching pedagogies that foster for students to learn to create with meaningful purpose.

Unlike universities and colleges, the main goal of institutes is innovation. RIT continually strives, much like its cousin Massachusetts Institute of Technology, to push the boundaries of technology and creativity. Design has a massive hand in this type of study though a means of creative thinking and problem solving; constantly searching for answers to problems through creation, ideation, and the iterative design process. At RIT design students are taught to analyze difficult and trying situations and find solutions that tend to solve them by creation though the use of various media.

The College of Imaging Arts and Sciences does not walk you through every step and design processes while you are in pursuit of your degree; instead they encourage you to discover for yourself by exploring various vendors,

alternative resources, and contacts that exist outside of the walls of the program and the school. By creating a design school that is founded in foundation arts, it mirrors some of the basic design curriculum principles of taught at the Bauhaus. RIT's foundation courses allow students to become familiar with various media and mediums with which to express themselves and their ideas. Unlike the Bauhaus, which dictates you become a master in one field of study before you can complete its curriculum, RIT's design school gives you the opportunity to explore various fields, helping to inform your design ideas and in turn push for a more well-rounded and self-sufficient student.

CLASSROOM CREATION –

DESIGN EDUCATION

Institutes, Schools, and Programs

School Without Walls

FIGURE 3

The students and staff's dedication to this small institute is utterly impressive. The faculty and staff reported that when they come to work, they often times are not the first ones to be there – the students are usually waiting at the door, wanting to learn.

This charter school, located in Rochester NY, integrates their students with the outside world, giving them actual problems, projects, and people to deal with during their assignments. Though they still must adhere to the standards of New York State, they seek an alternate means in which to accomplish this goal. Instead of learning in a classroom setting, the teachers of this school encourage the exploration of the surrounding businesses and public places to aid in their learning. The integration of outside resources promotes the students who attend to be resourceful and inquisitive of the world around them while researching. The school encourages its student body to become creative by actively participating in their surrounding neighborhoods.

School Without Walls Mission Statement (listed on their website):

> We're tearing down the walls that limit learning, brick by brick,
> and building up the foundations of success, person by person.
> We're developing the personal and academic skills we need to be lifelong explorers,
> learners, and problem solvers.
> We're creating innovative classes that reflect students, interests, combine subjects and connect
> us to the city and its resources.
> We're establishing supportive, meaningful, personalized relationships among
> all members of the school community.

We're working to improve our communities, living by democratic values and being active citizens.
We're sharing the power to make decisions that affect our classes and our school.
We're striking a balance between our individual freedoms and our communities' needs.
We're improving our mental and physical health.
We're becoming responsible, reflective, and self-directed.
We're strengthening our own unique identities and our understanding of others.

By touting this mission statement, the people of this educational facility enable students to be more apt to thrive outside the walls of education. Through discussions had with students who attend here, I have come to learn that the more we explore and the more we integrate ourselves with others, the smaller the world becomes – leaving all of us more capable of fixing problems through the use of communication, exploration, and community.

CLASSROOM CREATION –

DESIGN EDUCATION

Institutes, Schools, and Programs

Charter High School for Architecture and Design

FIGURE 4

This American, contemporary high school named The Charter High School for Architecture + Design or simply CHAD located in Philadelphia PA, has created a curriculum that not only offers students the opportunity to learn, but also creates the means to see their studies come to life.

The mission statement from CHAD (Listed on their website):

> *The Charter High School for Architecture + Design is a learning community committed to an innovative program [of study,] integrating the design process with the mastery of a strong liberal arts education. The school offers each student the opportunity for success and the preparation for life-long learning and responsible citizenship. CHAD is a thoughtful academic environment that engenders love of learning, intellectual curiosity, and new ways of seeing, and prepares students for higher education.*

They chose to use the design process as a medium for education and discovery. They realized that through design they allow students to have the confidence needed to explore problems, take risks, and turn challenges into numerous possibilities. From their philosophy about academics to their thoughts on how each of their students should be taught, this school creates an atmosphere that not only nurtures their students into becoming great thinkers, but like the School Without Walls, also fosters for them to become better designers of the world.

By simply visiting their website, you will see right away the enjoyment that the children who attend here have found. Most school websites do not have testimonials from former students about the love they have for their

school. With numerous pictures, insightful mission statements, teaching philosophies, and pedagogies this school is one that I have looked at closely as a means of comparison with my own teaching.

CLASSROOM CREATION –
INFLUENCES

Introduction

There are a number of people that I can think of who helped with the formation of my pedagogy and those who have influenced my life regarding education. I think of my grandfather and his middle school math classroom. I reminisce about my art classrooms with my high school teachers. I remember the various professors that taught during my undergraduate and graduate degrees. I have found that the educators that I admire most from my past have gone to great lengths to educate their pupils on how to help create systems that better our society. Those educators have aimed to think differently than what had been put into place by others – attempting to fix a system that needs to adapt to our current economy, resources, and learning population.

Though each of the people about to be mentioned have influenced my education, my pedagogy, and therefore my classroom, I do not declare to be an expert on their teachings nor do I hold true to only one of their teachings. I found myself becoming an amalgamation of the various teachings that I have received and a conglomeration of the activities that I have done throughout my life. Therefore, I cannot side with only one of the about to be mentioned, but merely state that they are amongst the few people who have had the most congruent information with what I have dubbed my pedagogy.

CLASSROOM CREATION –

INFLUENCES

John Dewey

I have always found myself a people person. I enjoy conversing with individuals from all walks of life; their stories and experiences enhance my life. After listening to people and learning from them, I find myself more aware of alternative possibilities; I become more conscious of other cultures and I feel better rounded, more attune to the variety of people who walk this earth. I have always told people that the most valuable yet underutilized resource in education is people. There is nothing that compares to the connectedness that we feel from another person. The amount of information capable of passing between people when they are engaged in a problem together is amazing. The possibilities that flow from mouth to mouth and the ideas that bounce from brain to brain seem to be endless. These thoughts are what drove me to find a commonality with the first of my pedagogical influences, John Dewey.

The basic principle expounded in Dewey's books is that education is not something by itself, nor is its primary function the formal training of youth for future adulthood. On the contrary, education is a lifelong necessity because it is the chief means by which society perpetuates its habits, customs and ways of life, and in so doing keeps itself from dying…Dewey points out that people learn most thoroughly through shared activity: that is, they learn by using things with others in their group. This conception of shared activity was one of Dewey's most fundamental principles – that the sharing of experience is the real goal of education; that it is the essence of true democracy, as well as one of the most potent factors in attaining it in society at large.

It gives me hope to know that despite all the boundaries put forth by digital and electronic walls and our continued desire to separate ourselves further from each other through the use of the internet and other technological advances, that we are still searching for connectedness, a person, meaning man and woman, a living-breathing-being, is still the most important piece. People continue to be the cause of all the interconnectedness. Dewey's pragmatic approach to language and interaction points out that it doesn't matter how we communicate, just that we do it and learn from it.

Dewey has created a pathway to think about how students interact with one another. His works caused me to ponder the aftermath of my teachings and strive to create activities and assignments that engage my students with not only information from inanimate objects, but also interaction stemming from personal reflection, conversation with peers, their parents, and other people that are involved in their lives.

Another section of Dewey's teachings that coincides with my own pedagogy is that actual learning stems from life - the accumulation of events, ideas, activities, actions, relationships, experiences...etc. He believes that "To learn to see anything well is a difficult undertaking. It requires the activity of the whole personality…This is true whether one is seeing a picture or painting it, mastering golf, building a new type of bridge, or reading the poetry of Keats"

(Dewey 1969, 7). Dewey's belief in the idea of life acting as a filter to see and experience with warrants me to allow the students in my classroom to pool ideas from events that have happened throughout their own lives and use them in their work. I also strive to tell my students that they are pools of information for each other and to learn from one another to create works, solve problems, and tackle assignments in ways that allow them to be wholly invested – to have faith that putting more of themselves into their work is a good idea. The assignments that I have created allow them to choose ways to solve problems in a means that they are passionate about and infuse themselves into their work.

Dewey's ideas affect my classroom in more ways than I recognize. Due to Dewey's teaching, theorem, and pedagogy I am more confident that group projects, when put into proper action, allow the interconnectedness of people and the cumulative intelligence of each individuals lives to give each of my students lessons that I am unable to create for them during class. Relying on the students in my class for information, "life lessons", and stories that relate to the topic at hand, have become a larger part of my teaching and personal pedagogy. Like Dewey, I believe that "when the method of the teacher leads the pupil to see relations he had not seen before, both teacher and pupil come into intellectual and emotional control of the situation" (Dewey 1969, 7).

Dewey's ideas regarding Project Based Learning also the ideas behind my some of my teaching methods are less command related and more along the lines of guided discovery. I think that as my teaching career furthers and I become more comfortable, my pedagogy, like that of Dewey's, will move steadily toward a conception that education is, primarily, a philosophy expressed in action and also that philosophy is of value as a guide to more intelligent lining only when its findings pave the way to better methods for solving problems encountered in the everyday affairs of life.

CLASSROOM CREATION –

INFLUENCES

Walter Gropius

Whether it is wood, metal, clay, or some other medium that I can get my hands on, I have always thought of myself as a builder. It is this underlying passion of mine that lead me to look toward books of architecture and design and while I was searching, came across Walter Gropius's book entitled *The Scope of Total Architecture.* As I thumbed through his book I found a commonality with Gropius's teachings. His belief that everyone is inherently a designer entranced me. He believed "that every healthy human being is capable of conceiving form. The problem seems to me not at all one of existence of creative ability but more of finding the key to release it" (Gropius 1954, 44). This one statement caused me to examine the orchestration of art education, student's involvement in their education, as well as the various teachers that compile a public high school student's education. It made me think of my own education and then ponder how I could cause a change in people's beliefs regarding their abilities in art or any other subject.

During my time as a graduate student at RIT, there was a level of professionalism and seriousness when it came to the majority of my studies. It was however brought to my attention that an element of fun, vulnerability, and imagination must be interjected to achieve truly great work. It was with fun in mind that I found Gropius's ideas behind teacher interaction and student imagination to be a point of note. Gropius initially advocates for teachers to allow students to create without strict guidance. He believed that

> …the whole task of the teacher is constantly to stimulate the child's imagination and his desire to build and draw. The child's drawings and models must not even be corrected, for his power of imagination is too easily irritated by grownups if we impose our own wider knowledge too much upon him. Knowledge of facts is indispensable, of course, but it must be taught with sufficient respect toward the younger being's specific imagination, which differs from our own and which tends to find new expression. Imperceptibly guiding the child during the very difficult transitions from play to work, the teacher – besides giving it the scientific facts and technical advice -- must encourage him again and again by trying to stimulate his indigenous inspiration. (Gropius 1954, 48-49)

Gropius's messages regarding teaching and student interaction were not the only thing that intrigued me. His desire to restructure education based around art was something that also fueled my passion to create a means for design to be better integrated into the walls of education. With this in mind, Gropius extrapolates on his vision for design education in his school entitled "The Bauhaus". According to Gropius his school of design would be a collaboration "of all forms of creative work, and their logical interdependence on one another in the modern world" (Gropius 1954, 20). Gropius wanted to start a school that not only embraced the evolution of industry, but also brought with it the skillful and creative juices of the past, present, and future. By creating a revolutionary educational process and a

place where future generations have the possibility for harmonious integration of technology and art, Gropius showed the rest of the world how to view design and how its creators could respectfully integrate design in the modern world.

Gropius set up a theoretical system of education to help mold young students who desire to become architects and designers alike. Throughout his curriculum he discusses the importance of allowing experience to be the guide for education – specifically stressing each section of his ideas for a "common denominator of design" as follows:

Language of Vision
Emphasis on Practical Experience
Experimental Workshop and Preliminary Design Course
Professional Training/Field Practice
History of Art and Architecture

His sequence of education seemed more practical to me and made me ponder integrating portions of his ideas into my teachings; not only allowing myself to be more accepting of others artistic abilities, but also to truly get at the root of a progression of learning, experiences, and experimentation. His message regarding learning and educational reform caused me to examine my own educational background and turn my experiences into something that I deem as beneficial for others. It allowed me to be accepting of other people's learning process and to be more generous with what I view as design in my classroom. I became less concerned about what my students were mimicking or where their influences came from at the time, I concerned myself more with the overall effect of the discussions and assignments I gave on their career paths and lives at school. Gropius said it best by stating: "Why split hairs about who influenced whom when all that really matters is whether the results achieved improved our life?" (Gropius 1954, 84).

CLASSROOM CREATION –

INFLUENCES

Donald Schon

> His hypothesis is that *all* professions are 'designlike' in some relevant respects. Thus we can organize *all* professional education on the template of educating designers: this is Schön's 'new design for professional education,' and points towards his new design for the university and for education as a whole. (Waks 2001, 41)

Coupled with John Dewey's notion of "exploration of experience", Donald Schön created a concept that he dubbed the "Reflective Practice". The idea is centered on lifelong learning and is accomplished by a practitioner or professional analyzing experiences in order to learn from them. In Schön's book, *The Reflective Practitioner:How Professionals Think In Action,* discussions concerning reflection of one's self, the professional, and reflections on the situation, the profession, span a large range. He does however focus on Design in his book and discusses his viewpoint of what role a Designer plays in the professional world and how their actions, sometimes purposeful and not, dictate the concluding result of a design. To Schön, a

> …designer makes things. Sometimes he [she] makes the final product; more often, he [or she] makes a representation – a plan, program, or image – of an artifact to be constructed by others. He [or she] works in particular situations, uses particular materials, and employs a distinctive medium and language. Typically his [or her] making process is complex. There are more variables – kinds of possible moves, norms, and interrelationships of these—than can be represented in a finite model. Because of this complexity, the designer's moves tend, happily or unhappily, to produce consequences other than those intended. When this happens, the designer may take account of the unintended changes he [she] has made in the situation by forming new appreciations and understandings and by making new moves. He[she] shapes the situations, in accordance with his initial appreciation of it, the situation " talks back," and he [she] responds to the situation's back-talk.
>
> In a good process of design, this conversation with the situation is reflective, In answer to the situation's back-talk, the designer reflects-in-action on the construction of the problem, the strategies of action, or the model of the phenomena, which have been implicit in his [her] moves. (Schön 1983, 79)

Schön's description of what he believes a Designer is, what they do, and how they think, helped me to reflect on my role as a practicing Educator and Designer. By taking the time to reflect on design moves made, problems at hand, projects from the past, current events, and trends I feel that the way I approach a design becomes less inhibited and consequently allows me to create more freely so long as my reflection continues throughout an iterative Design process.

Schön's discussions concerning reflection work for both student and educator. When an assignment is given and students react to the task, there is a point of reflection on both parts. From the students, it is a recollection of experiences that help to formulate how to accomplish the scope of the task, taking into consideration the overall task and its individual parts. Once the student beings the task, the Educator, reflects on the students thought process,

abilities, and concepts – this is usually done through a critique or one-on-one discussions about the students design direction/intent. A proper critique/review should be one that incorporates what, Schön describes as the "language of designing"-- as a blend of discussion, action, and drawing. Utilizing all three simultaneously creates connections with multiple learning capabilities at once and aids in creating an interconnectedness that helps ideas cross-pollinate and flourish in the mind.

The reflection of Educator toward Students and their works/designs are very similar to the Design Process. When a problem is given to a situation and an initial attempt has been made by a student, it is the Educators responsibility to reset the problem in a different way, to offer a different way to think about how to approach the situation/task at hand. It also becomes the Educators responsibility to restructure the task into small accomplishable goals while still focusing on the larger assignment at hand. Coupled with restructuring, Schön encourages the interconnected use of language, drawing, and movement to help develop ways to solve problems.

FIGURE 5

When utilizing the "language of designing", it is the Educators job to reflect in-action and use the relationship of drawing, speaking, and movement to help form reflective interactions for the student. When drawing the mind uses visual cues coupled with hand gestures and body movements to help signal relationships that are also connected with language and descriptors being used to frame the conversation.

Regarding my classroom, Schön's description of how to interact with students and better facilitate ideas meshes well with my teaching style. I find it very enjoyable to tackle problems with drawings and discussions. Schön's promotion of purposeful "reflection-in-action" also blends well with my style of social, discussion, and forum based interactions with my students. Thinking on your toes can be difficult, but if it is done with the big task in mind, spinning a web of different solutions and permutations to the problem can be a very positive attribute to anyone's teaching methods. When a problem is given, people approach it differently causing variation in how a solution can be reached. After all, not every two people learn the same way and it is important to diversify your teaching abilities, as an educator, to accommodate others' abilities, as a student, to learn. It is the Educators job to create order from the chaos and allow students to "find new and unexpected meanings in the changes they produce and to redirect their moves in response to such discoveries. And if they are good designers, they will reflect-in-action on the situation's back –talk, shifting stance as they do from "what if?" to recognition of implications, from involvement in the unit to consideration of the total, and from exploration to commitment" (Schön 1983, 103).

CLASSROOM CREATION –

INFLUENCES

Howard Gardner

A current leader in educational theory, Howard Gardener created the idea of that our brain does not function solely in "black and white" or "yes or no" answers, instead it functions based on a combination of interconnected correlations making up conscious and unconscious thought patterns that he has named the Theory of Multiple Intelligences. Gardener's theory also speculates that because people have these different types of intelligences, and they are all heightened differently from person to person through various physical and nurturing environments, that people learn differently. Gardener believed that everyone has the ability to learn and learn the same basic information, it's just how we differ in our abilities to translate, decode, and retain that information that makes Gardener's theory applicable to design based studies.

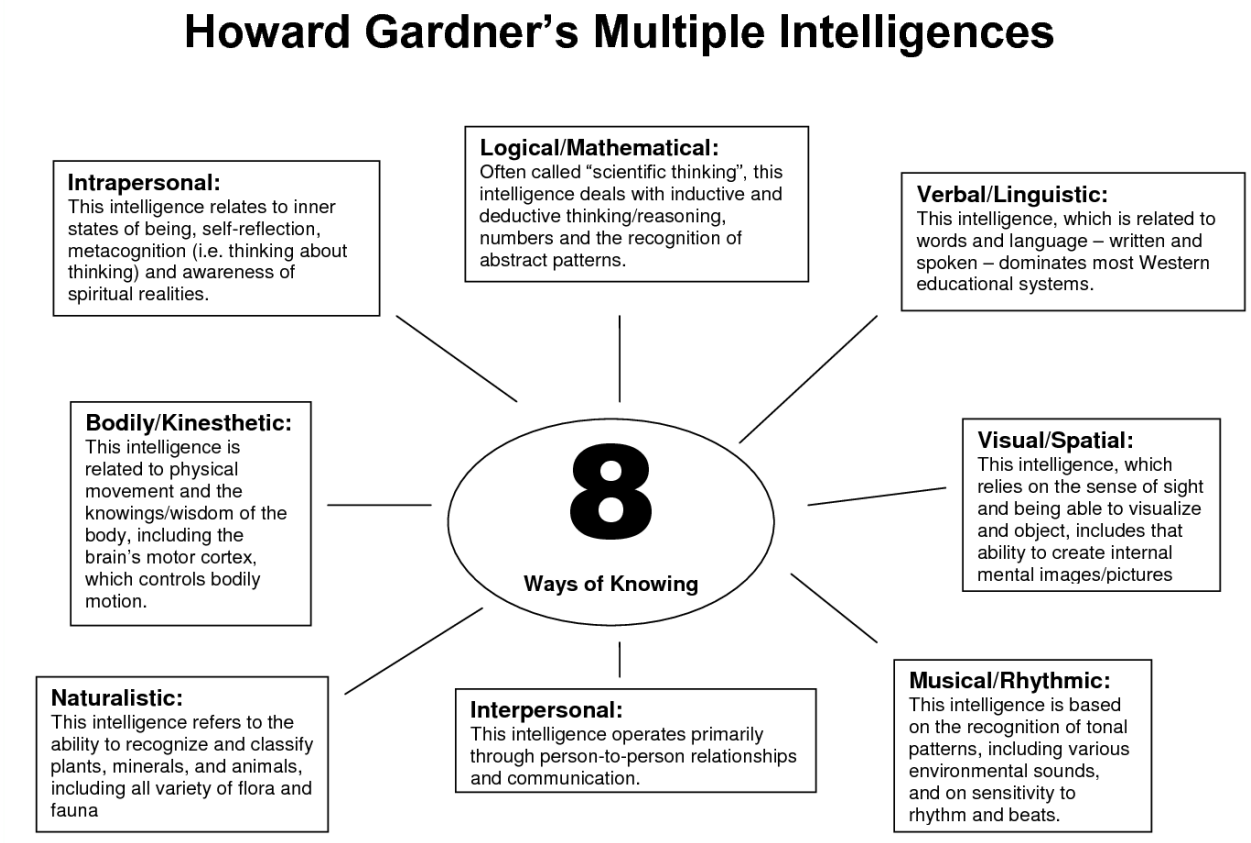


FIGURE 6

Because of Gardener's claims regarding our ways of learning, he also argues that standardized testing methods are an inaccurate way of measuring true intelligence. He states, "Many observers are not happy with this state of

affairs. There must be more to intelligence than short answers to short questions – answers that predict academic success; and yet, in the absence of a better way of thinking about intelligence, and of better ways to assess an individual's capabilities, this scenario is destined to be repeated universally for the foreseeable future" (Gardner 1983, 4).

Gardener's theory is a prime example of why cross-curriculum design based education should be integrated into current public high school educational systems. As an educator who seeks better ways to communicate educational topics, coming to an understanding of not only different personalities that make up the student population but also different learning capabilities that people possess, there should be a push that fosters for a change toward educational methodologies and pedagogy that embrace the idea behind not just how smart we are, but what intelligence really is.

CLASSROOM CREATION –

MY CLASSROOM

Introduction

During my time at graduate school the opportunity to apply my findings and research toward a freshman elective class in the School of Design emerged. I figured that this would be a great opportunity to stay on the collegiate side of things while getting very close to the target market that I was looking for, high school. If I were to speculate on the average intelligence and skill level of this type of class I would say that most of the students were equivalent to that of an AP art class. So, I basically envisioned the students I was teaching as seniors in high school – which is, let's face it, exactly what they really are anyways. In conjunction with the type of student I was teaching, I also had the ability of teaching new sets of students every 11 weeks or so. This proved to be advantageous; I could try new assignments and get new perspectives from different students. This class and the students who came into it carried on for two years and regardless of how many students I taught and the quantity of time given to each of the sections, I do know that the reactions received as a result of my teachings were genuine and did affect the students and my understanding of what educator means.

So now that I had students to teach, it was then my job to create some assignments. I knew that I wanted to be able to give each of my students the advantage of not only seeing Industrial Design from an insider's perspective, but also the opportunity to be able to explore various realms of Design while spelunking through the caverns of their own minds, bodies, and souls. I wanted each student to be able to look within their own lives and experiences and pull out the details that shows them how much Design exists within their lives already. I wanted them to have a realization, the way that I did, about how Design, Design practices, and Design thinking/theory can help them to not only analyzes the world in which they live, but also allow them to become more conscious, knowledgeable, and engaging people within the communities and world in which they live.

CLASSROOM CREATION –

MY CLASSROOM

Pedagogical Approach

It is my hopes that my approach to education will never be the same, and that even since this document has been published and vaulted in the annals of academia, my life has changed the way I approach education and learning. I have ascertained though listening, experience, drawing, creation, failure, and hardships the importance of education. By consciously melding together my past with my foreseeable future the statement below should hold true on how to properly educate others long after my days as an educator have ended.

Pedagogical Statement:

I believe to be able to understand and create purposeful and well thought out design one must be able to understand all facets of a problem in a holistic way – creating understanding through investigation, collaboration, group discussion, and the ability to understand the relationship of the final outcome on society. Students should be encouraged to understand their decisions and what the outcomes are of their actions. By creating a means for students to learn in this way, they become responsible for creating their own success inside and outside the classroom. My role as educator is to formulate and sustain an innovative, interactive, and interdisciplinary environment that ensures each student is given the opportunity to discover personal success, ethical accountability, and shared understanding for the collective good.

DESIGN ASSIGNMENTS –

Introduction

Try and think back to your time in high school. Maybe you went to a private school? Maybe you were home schooled? Maybe you went to the biggest public school in your state? Regardless, I would like for you to go through the types of classes that you were a part of and ask yourself a few questions.

Number one: How many classes do you actually remember?
Number two: How many times did you ask yourself "Why am I learning this?"?
Number three: How have they helped you to analyze, interpret, and synthesize the world around you?

I do understand that without a cumulative education, comprised of various studies and assignments, there would be no real growth in learning, but if you were like me, you remember high school as being a time of social awkwardness, segregated classes, and memorization tables. I've asked numerous people both young and old about what they learned during high school and also why they learned it. The vast majority of them tell me the same answer - "I don't really know why I learned what I learned" and that it wasn't until college or your first "real world" job that you really started to see things in a different light – how things correlate to one another and why you actually needed to be taught what you were.

I profess that I too have fallen into that trap and am often uncertain as to why I learned what I have learned. I know that learning anything is better than nothing and that knowledge is the retention of information put into proper use, but there are definitely some lessons that I felt like should have been taught that weren't. Therefore, I proposed to create assignments, during my time as an adjunct professor at Rochester Institute of Technology, which not only help to create a bridge between reality and academia, but also assignments that challenge the recipient to analyze their lives, question things, and hopefully allow them to be more conscious people in the end. Through all the different forms of study and the attempts at curriculum creation for students, there seems to be something missing that allows students to create a link to how education really does affect their lives and I believe that design is a wonderful medium to cause such things to happen for students.

The assignments/projects in this section were created in a classroom over the course of one and a half years consisting of 15-25 students, around 16-18 in age, who met once a week for 11 weeks.

The following sections were created with teachers for public high school teachers who educate their students in various subject matters. Some of the assignments/projects will be for all teachers regardless of their subject while other assignments will be more specific to a certain study.

Sections are separated as follows:

Introduction to Section – This is a brief overview about each section and their relevance to education through the use of Design.

Assignment/Project – A summary the assignment/project.

Classroom Strategy and Pedagogy – What occurred in my classroom while assignment/project was taking place.

Outcomes – Synopsis of student reaction and interaction with assignment/project.

Which Classroom – Hypothesis as to where the assignment/project may best be used in general public high school education.

DESIGN ASSIGNMENTS –

DESIGN DISCUSSIONS

Introduction

The discussion of design and the world surrounding design is one of the more crucial things you can do to create well-minded students. There are numerous readings, articles, and other media that relate to design. Some are more direct and discuss the nitty-gritty of design -- specific sects of design, materials, approaches, etc. -- while others are more reader friendly and discuss design in more of a narrative fashion. There are also other types of media that indirectly relate to design used as kind of a peripheral aid – something that helps to discuss issues that create better understanding about design from an outside perspective -- i.e. current events, economic discussions, news about product, design shows in galleries, etc. Regardless of which type of discussion medium chosen, there has always been a bit of knowledge gained and something you can pass along to students concerning issues related to design.

Note: Each of the following sections are in no way a definitive means of discussion about design and the following readings/articles discussed are merely suggestions – they should be used as a guide into the various realms of design.

Something else noteworthy: Be aware readings and activities given during one year may become obsolete. Design is a constant and ever evolving process – the readings given in class should reflect that.

ASSIGNMENTS IN THIS SECTION:

General Design Readings – Forums and Lectures
Other Discussion Mediums
Research and Design

DESIGN ASSIGNMENTS –

DESIGN DISCUSSIONS

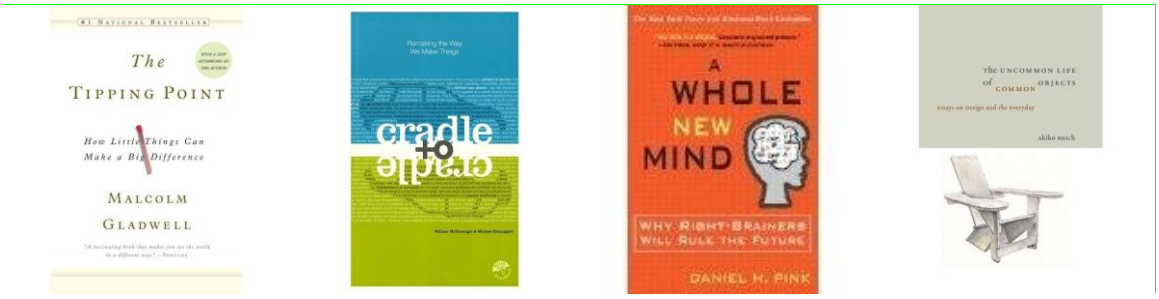
General Design Readings (Forum and Lecture)

People have been swept up in the constant bombardment of fashionable and technologically enhanced waves find Art, and most of the concepts surrounding Art, to be a safe-haven -- a place of expression, a kindred understanding, and convergence of make believe with reality. The only problem does not lay within the works of art, but how we interpret it, how we sift through the flashing lights and billboards to decipher or look-past the true meaning of what is being projected toward us at an alarming rate. With this constant onslaught of art and media, classes never really allow an integrated understanding of how the various studies learned during our high school tenure relate to the real world. Due to this typical type of educational upbringing, discussing Design and Design-related topics with people at a younger age becomes of dire importance. Any classroom can easily become a place where the various topics that are encased within the realm of Design can be discussed.

The topics surrounding the word "Design" do not necessarily mean such things concerning chairs, automobiles, cell-phones, computer games, and or whatever other preconceived stereotypical Design related topics automatically come to mind. Design should be thought about as an idea. The concepts of Design and what topics of discussion should be presented during a lesson should vary and for good reason. Since design is an ever-changing phenomenon, it is important to stay up to date on topics concerning a variety of issues. Books, articles, and newspaper clippings should really spark conversation for students about some hot topics that concern the Design world at present. Regardless of topics and regardless of the depth of readings, the discussion mediums given should create a forum for learning, conversing with one another and also allow the students to gain knowledge about how Design relates to a wide assortment of topics.

Below are some images of a few books that I have used over the past few years to help create discussions, challenge students, and open minds a bit more.

CLASSROOM STRATEGY AND PEDAGOGY



FIGURES 7-10

Excerpts from books like these are small gateways into the world of Design. Because the books discussed objects, they therefore become a catalyst for discussions concerning the "things" that surrounded each student. The enjoyable thing about each of these books is how it relates to "stuff" and in turn Industrial Design. People find a kinship with "stuff" more easily than concepts and it is somehow always enjoyable to discuss the ideas behind the systems in which "stuff" exists. Because the books discuss "stuff", everyone who reads them can relate, and thus lead to some discussions about Design that seem to hit home in a more personal and memorable way.

Due to the nature of discussions and forum based lectures, it is important to have topics for discussion ahead of time. Discussions will vary from topic to topic and class-to-class, therefore it is good to ask poignant questions to help fuel the fires of thought. Asking questions like: "What gives something value?", "What gives something worth?", " What is the difference between value and worth?", will help to allow students to begin to learn that Design is a bigger idea than making things look pleasing to the eye. Asking students what they thought about the readings, followed by a few key questions pulled from the readings is always a good tactic. I try to keep things thought provoking which allows students to be introspectively inquisitive and therefore challenge themselves to ask questions and think about the "stuff" that surrounds their daily lives. On many occasions, the simple reading about a cereal box in Akiko Bush's Book *The Uncommon Life of Common Objects* spawned numerous discussions in my classroom. From their nostalgic desire to have toys in their cereal again, to the discussion of whether or not Captain Crunch really did cut the roof of their mouths, each student had a different and interesting story about their breakfast rituals, and inadvertently become more aware of how an objects Design effects them on an emotional level not just on a visual kinesthetic one.

OUTCOMES

Reading and discussing anything with students is a good thing. The activity allows them to literally be on the same page at times, but also to learn about each other off the books. My ultimate suggestion is to find readings that raise questions about themselves. I have found that by creating an environment that allows students to ask themselves "Why?" is usually the best thing for them. It allows them to question the world around them and attempt to correlate what they are learning reality. Books on the history of design, types of design, implications of others in neighboring design fields, current trends, and how design affects us today are all good examples of thought provoking readings that are sure to spark interest in the world as making them more aware of their role in it all.

WHICH CLASSROOM?

This type of assignment would be advantageous in any class that utilizes reading and research as a means for educating. Typically any English/Literature class would gain immensely from these types of assignments – creative writing perhaps. For example the use of an assignment like this in a History class may create tasks that allow

students to look up the history of objects that existed during the time in which they are studying and may lend to a better understanding about the time period being discussed – a relatable experience.

DESIGN ASSIGNMENTS –

DESIGN DISCUSSIONS

Alternative Forum and Lecture Mediums

Fast, fun, and fairly accessible, websites are a great form of education. From the newest product to the most recent discussions regarding breakthroughs in solar technology, some of the websites that are noted below create great ground in which both discussions and projects can be created. True there are literally millions upon millions of websites out there that allow you to get lost in all sorts of information, many of which are full of meaningless drabble, but fortunately there are those that seek to shed a little light on what the Design world has deemed important. Although these mediums are different, they function in very much the same way as readings do. The only major difference is that the sites allow for the reader/onlooker to sift through countless amounts of ideas and subject matter in seconds and then clicking to make lateral and potentially deeper connective movements to the topic at hand. The ability for students to be able to gather and view different information, rather than all the same, will tend to lead the class toward a plethora of different types of discussions.

CLASSROOM STRATEGY AND PEDAGOGY

FIGURES 11-14

With technology integrating itself into classrooms more and more every day, I found it necessary to incorporate computer mediums and web-based design discussion. Some of these websites and magazines are not founded in academics, yet still offer good sources for topics of discussion. They create a means of seeing trends in design and also ways to view the world a little differently. My class used these websites coupled with magazines to read up-to-date information and gather new data concerning current topics that seemed to suit their individual fancy.

As a means to keep us all up to date on something in the world of design, I asked my class to look at the websites that I had suggested, peruse the Internet for other sites, and then come into class ready to discuss a topic that they had chosen and present a little "book report". From the newest inventions in sustainable product,

to the hottest new car, the websites and the information ran a wide and interesting gamut. Again, like the books and article excerpts that I chose for them to read, I used this medium to create more of a forum based Design discussion. I asked them to write a little bit about what they had found and some of the site information so that we could reference it if needed. I often thought about asking my students to create a design research paper, but found it a little too daunting for a two-credit design elective. If I had more time with them and they were with me all year round I definitely would make researching a topic regarding design an assignment.

OUTCOMES

By allowing students to utilize different mediums to discuss and research Design and other contemporary and historical topics, it created a well-rounded, current, and sophisticated understanding of what Design means.

WHICH CLASSROOM?

This assignment should be used in a classroom that utilizes research as a means of educating. English and History top the chart, but because this type of medium exists in more of the technological realm of things, technology class or even art class can adopt this assignment easily. By allowing students to be mavens of information, will create a broader base in which their knowledge can stand upon and help come up with some assignment ideas for you to be able to tackle in your class. Let your students bring some neat ideas and assignments to you.

DESIGN ASSIGNMENTS –

DESIGN DISCUSSIONS

Research and Design

Research should be done not only to gain an understanding of a topic given, but also because it allows for a Designer to see previous attempts made at creating works. Good Design work is a culmination of skills and understanding. As a Designer, skills are needed to be able to articulate an idea in words or with a drawing, but these analytical and research based skills will also help in gaining an understanding of how, what, and why you are creating.

With the world becoming smaller, it is necessary to show students the inter-connectedness of things – the systems in which they live. Students need to be able to take what they have researched and infuse it into their designs. Students gain a different kind of knowledge from research based Design, It gives them insight into what already exists within a culture/lifestyle that they may not be accustomed to. Research allows them to become a better well-rounded student who can grasp on to the understanding of people and therefore more creative design.

CLASSROOM STRATEGY AND PEDAGOGY

FIGURES 15-16

This assignment came out of the combination of the forum based assignments and the need for my students to learn how to understand, empathize, and sympathize with other people who belong to other types of cultures. It also spawned out of a combination of the experience experiment (which is found in the section entitled "People Problems") and a new snowboard-based culture assignment.

First, I split the class into different groups based on some of the same classes that are typically found in a public high school setting.

History

Economics and Marketing
Science and Technology

Since Art was the one region that they could all relate to, due to their involvement in CIAS (College of Imaging Arts and Sciences), I did not create such a group for them to be a part of at first. I did this to show my students that some of the subjects that they are learning, or have learned in the past, relate in many ways to a subject, like art, that stereotypically would not seem to utilize them.

My idea was to create a small assignment based on what a multi–curricular classroom would have done. I gave each group a brief synopsis of what each of the topics would entail and allowed them to become involved with whichever one they decided. The science and technology topic would research the technological improvements made over the years in sideways sport activities (i.e. Snowboarding, Surfing, Skateboarding, Wakeboarding, etc.). The history group was to give us an overall timeline of these sports; highlighting the cultural and historical events that have led us to where the sports are today. The economics and marketing group was to research recent trends and mainstream cultural aspects of how these sports have infiltrated our daily lives.

Because this class only met once a week, they continued their research for two weeks; updating me every week within their respective groups. The first weeks assignment was just to research and come back to their own groups and tell each other what they had found; compiling information and seeing what over lapped. The second week they were to create a little presentation to the whole class about what they had found – graphically displaying and discussing each of their groups' findings. Also, in relation to the type of assignment this is, each person was held accountable for the information presented as well. They each were to hand in information found and present collaboratively their findings both for the research as well as their new product.

After all the research was complete they were then given the assignment to create new product for the snowboard culture by using Art/Design. I felt that by leaving the assignment open-ended enough students would have the advantage of running the gamut with whatever avenue they wished to pursue. Some students created hard goods (helmets, bindings, and snowboards) while others created soft goods (goggles, jackets, gloves, etc.). Whichever realm the student went with the assignment, each of the outcomes infused thinking and creation beyond just color, line weight, and fabric variations; gloves were given light up palms and tops to help you learn how to ski and snowboard, jackets were Designed to reflect more of the sharp angles of the snowboard and the parks that they are ridden within. Some students even went further to create product based more on the lifestyle of a snowboarder rather than the objects a snowboarder would own. Guitars with built in recording equipment reflected more of a snowboarder's attitude and a key chain that had a global positioning system attached to it for back country hikers, where just some of the objects that the students picked out that they felt reflected more of the lifestyle seen in this sub-culture.

FIGURES 17-18

OUTCOMES

The students seemed to have fun looking up various types of information regarding the sideways-sports sub-culture. They also seemed to like the idea of researching in groups rather than by themselves. They seemed to be able to share their research more easily this way and enjoyed seeing how each other's corresponding research components related to the new designs. After having completed this project, I do feel that adequate time is essential for sufficient research, development, and understanding of a topic. As a teacher it is important to research many of the ins-and-outs of the topic you are going to be discussing. Relaying where to research through local stores/shops, websites, magazines and books, clothing, music, and other related topics and interesting media helps students get off on the right foot for an assignment/project of this magnitude.

WHICH CLASSROOM?

Research must be completed in order to fully understand any subject matter. This type of assignment could be used with variously any classroom. By assigning a researched based project, it will hopefully allow the students to grasp more of a holistic vantage point regarding any subject. A History classroom could easily use an assignment/project like this; researching a war or battle and creating "historically" imaginative battle gear or goods to solve some problem related to the skirmish under investigation. Regardless of the classroom, research with application helps to drive home a better understanding of any subject being studied.

DESIGN ASSIGNMENTS –

ART IMPLEMENTATION

Introduction

"As soon as I understand the scale of the building and the relationship to the site and the relationship to the client, as it becomes more and more clear to me, I start doing sketches"
FOG (Knight, 2012).

Though it seems to have started to change within the past few years, the world of Art seems to have had the stigma of shooting down those without what has been dubbed as an "artistic eye". I'm sure that this statement could be argued up and down, creating great debate about what art truly is and how artists create work. Regardless, it seems to me that what most high school curriculum searches for, concerning his or her definition of a good artist, is still someone with a steady and traditional hand. New York State public school curriculum tends to lean more toward advocating for traditional fine arts skills and traits, and rightfully so. Without proper skills in the art classroom, designers and other art-based thinkers would have a more difficult time speaking to each other in their *Pictionary* based language.

To combat the stigma surrounding art as a means of perfecting pencil and paintbrush skills there is Design. Rather than looking solely at your ability to draw and paint, Design at its core peers into your ability to think and communicate. This is the true beauty and essence of Design. You don't have to be an amazing artist to think, have good discussion, articulate ideas, and subsequently become a great Designer. I know that art is the medium that most Designers use to communicate, but not all Designers are modern day Michelangelo's –hardly! I'll use world-renowned architect Frank O. Gehry as an example. He is dubbed one of the best modern Architects, creating work that challenge materials, mathematics, and manufacturing. And though he does create interesting buildings, his actual drawing skills rival that of a seven year old. For him, communicating an idea is the most important element of Design. Rather than beautiful oil paintings and perfect line drawings, the sketches and scribbles that he creates happen to be more for the process rather than the portrait.

"The key to Frank O. Gehry's architecture is in his drawings. A Gehry building begins with a sketch, and Gehry's sketches are distinctive. They're characterized by a sense of off-hand improvisation, of intuitive spontaneity. The fine line is invariably fluid, impulsive. The drawings convey no architectural mass or weight, only loose directions and shifting spatial relationships" (Knight, 2012).

FIGURE 19

This information is pertinent because I do not want students to be afraid of using art and in turn design. I don't want teachers to be afraid of infusing art into their classrooms. I am informing you about this because I want people to know the beauty that design possesses regarding the artistic world. Art is the universal language of design, but in lieu of modern movements and contemporary artists the act of communicating is changing. It no longer is drafting and precision drawing tools and techniques that get the job accomplished; it has become more about the idea behind the design. Through Design's incorporation of art, ideas can easily be shared and put into motion without passing judgment on someone's skills in art, but rather their skills as a thinker. The creation of Art, especially Fine Art, is a different issue than communicating an idea through the use of Design.

ASSIGNMENTS IN THIS SECTION:

Re-Design Assignment
Metaphor in Design
Junk Band
Light up a Space

DESIGN ASSIGNMENTS –

ART IMPLEMENTATION

Re-design assignment

Allowing creativity to flow freely while honing in on a focal point allows students to create with purpose. By giving students the challenge of redesigning new objects it allows them to use mediums that they may not be accustom to, challenge their thinking, and question their morals, civic duties, and their acts as consumers. Art allows for each student to express his or her ideas to one another in a quick and non-judgmental way. Most people, at one time or another in their lives, find hardship with objects related to their design/function. This assignment allows for students to search for a problem, subtle or obvious, which exists within the confines of their living space, and through discussion, personal reflection, inquisition, skill, and art attempt to solve and justify a solution to a problem they discovered.

CLASSROOM STRATEGY AND PEDAGOGY

The first assignment given in conjunction with readings is to re-design an object. The discussions preceding the assignment are ones pertaining to what makes good and bad design. The positive and negative thing about discussing how people feel about each of these issues is that they are subjective. Though the topics can sway the class into discussions of economics and issues pertaining to trade, most of the conversations tend to stay in the realm of intrinsic value/worth of an object. Even though the conversations usually become subjective debates, it does allow students to start to ponder what makes them the type of consumers that they are, question what the difference is between value and worth to them, and also lament on what causes an object to attain a certain price.

With no other agenda than the discussions that they bring up during class, they were to simply go home, pick an object that they feel is of "good" design and redesign it. As a class, we went over how to present the work and in what format is advisable for a presentation. The students then were asked to bring in their first renditions next class. They were to re–design the object of their choice and bring it in with the original price of the object written on a piece of paper. They hung their re–designs on the wall and then were given a quick critique of their art skills, discussing what make one drawing better over another and how to make them more readable from farther away. They then placed the price of the original object next to the redesigned object and then presented to the class their newly redesigned object. After their presentation is given about the new object the students wrote the price of what they feel the newly designed object was worth. Most students found it interesting to try and understand what gives something value versus what achieves the highest price tag.

CONCLUSION

This assignment not only allowed students to work on their art and design skills, it also gave me an opportunity to talk about economics, the price of tooling, manufacturing, shipping, packaging, and retail – have more discussions about the system of design, creation, and their involvement with being a consumer.

More recently than ever, the word design has become tossed around without consideration as to what its true meaning is. More specifically, Industrial Design as an institute has moved from a chic elite club full of expensive and unique chairs, kitchen gadgets, and clothes to the linoleum showrooms of Target and Wal-Mart. I'm not professing that we move back to a time that design stays in the realm of the rich, but I am asking us to think about how things have come to this state. I am asking us to think about how we have been taught to think.

WHICH CLASSROOM?

This type of assignment could be utilized in any classroom that would be discussing current trends and innovations. Because of the project's scope and focus, most of the works created by the students turned critiques into discussions regarding bigger issues involving design and creation. Students will enjoy asking each other the question "why?" in regards to design, aesthetics, and their role as consumer.

DESIGN ASSIGNMENTS –

ART IMPLEMENTATION

Metaphor Design

For Industrial Designers, creating for the sake of creating is not always the most successful way to develop a great marketable product. To create with purpose and give an object innate intent is a Designers main goal. Through the use of semiotics, or meaning-making, objects Design can be enhanced. Semiotics is a study of "signs" and is closely related to the field of linguistics in that you gather relationships and construct meanings surrounding, in this case, an object through the use of metaphors, analogies, and symbolism. These linguistic devices allow the Designer to create new ways to think about what an object is "saying" and truly giving an object and its Design meaning.

CLASSROOM STRATEGY AND PEDAGOGY

The use of metaphor allows the Designer to go beyond purely aesthetic qualities to a state of true designed bliss; a symbiotic relationship between aesthetic and the unseen inner characteristics of an object. By asking the student to think about what the object is "saying" they become more aware of the objects purpose, rather than just take for granted its innate qualities.

FIGURES 20-21

There are usually two ways in which to present this assignment. The first way is what I call a "smash together metaphor" design. An example of this is one that a colleague of mine completed during her graduate work. If I remember the story correctly, she had a bad incident with a pressure cooker when she was a young girl in India. And due to the incident has had a little bit of a fear of them since. Due to that fear, she wanted to combine her idea of what a pressure cooker is to her, her metaphor being a bomb, and what her final product would be. She ended up creating a pressure cooker that resembled the shape and look of a nineteen fifties cartoon bomb, complete with fuse and all.

The second way of presenting this project aims to be a little more "heady" with the picking of the metaphors that describe the object. A constant example that I usually bring to my students attention is one to do with my water bottle. I carry a water bottle to class daily and often refer to it in my examples.

The dialogue concerning this version of this assignment often goes like this:
Me: "What is a bottle?"
Student: "A container."
Me: "What else is a container?"
Student: After some time…"A Box." Someone usually replies.
Me: "Good. What's another word that is synonymous with the word container or box?"
Students: "Ummmm, a boat, a cup, a space, a vessel…"

Once I hear the word "vessel" I usually stop them and ask:

Me: "What else is a vessel besides a boat?"
After a few minutes of them thinking about it I ask:

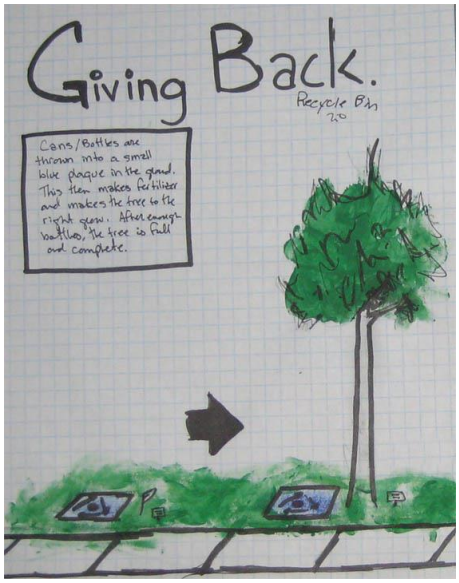
Me: "What about a mother? Would you consider your mom a vessel for you?"

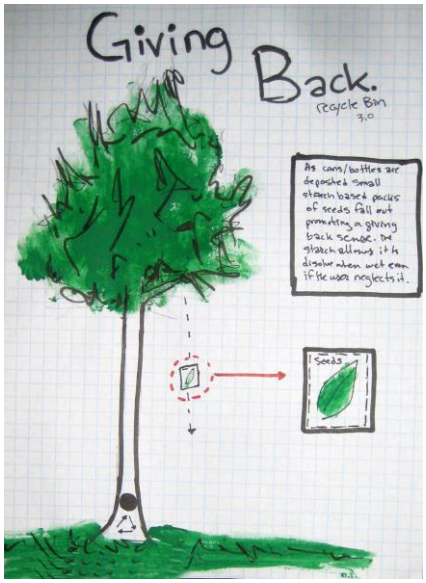
I usually get a few bewildered faces and then explain to them that the bottle that I bring to class is not a whole lot different than that of a mother. I then finish by asking them:

Me: "So if how do I make my bottle look and feel like more of a 'motherly' object?"

And that is the point of the assignment. How do you take the internal/innate qualities of an object, discuss it in metaphor, and then re-design it to exude that intrinsic quality?

In the example below, one of my students took the concept of recycling and thought about what it really means to them. They decided that people needed to see the effects of their recycling efforts in a positive way, and created a system of "Giving Back". They started the assignment with the idea of recycling and had a few first attempts at what a trash can really meant to them; re-designing it with more of the smash together technique. But as the assignment progressed for them, they found themselves dealing with more of a moral debate concerning the issues regarding the state of our consumption as a nation. They discovered, coupled with a reading from *Cradle to Cradle* by William McDonough and Michael Braungart, that the issues of recycling is more about one of convenience for people as well as an understanding of the effects of it. They used a tree's ability to take nutrients and produce life as a metaphor for how we should be dealing with our level of consumption, and used that as a means to show to others the benefits of recycling and also becoming a conscious consumer.





FIGURES 22-23

OUTCOMES

The purpose of the assignment is to allow students to gain an understanding of how to view the inherent and intrinsic qualities that exist within a work of art whether it is an object or a painting. The words semiotics and mysticism are the words that seem to encompass the most prevalent meaning for this assignment.

> Mysticism means, psychologically, a sense of profound and moving identification with something not ourselves. It means also that the identity felt is not demonstrable, in the sense that a man's legal nationality is demonstrable, or his membership in a club or other organization. In mystical states of mind, in other words, we are conscious of an expansion of our personality through union with something not ourselves, but this union is felt and not seen. The mystic feels that the dissolution of the boundaries which ordinarily separate him from the world is not merely fanciful or illusory, but represents a truth deeper than the facts which meet the eye. (Buermeyer, 76)

By searching for the inner meaning of what a design is supposed to be, or become, the designer/student has a more dynamic relationship with their work. It also allows for the viewer to be swayed in a direction that they normally wouldn't necessarily lean towards. This style or method of design allows for the viewer/designer/student to gain a more deep-rooted, though not always understood, meaning or kinship to the work that is produced.

WHICH CLASSROOM?

This is a great assignment and a wonderful opportunity to be able to combine English or literature with design. Although, the assignment involves the use of metaphors, similes, and philosophy, it does not mean that there cannot be an infusion of this sort of project in other classrooms. Language is everywhere and so are the objects that can become personified through them.

DESIGN ASSIGNMENTS –

ART IMPLEMENTATION

Junk Band

Like math and art, music has a wonderful way of communicating universally. This assignment was created with the love of music in mind. Coupled with ideas of symphony from a reading by Daniel Pink, I created an assignment in which students were to listen to the various sounds around them, synthesize the information, and create a song for the class. The purpose of the assignment was to allow students to explore their surroundings in a way that they may not already do. To paraphrase Mr. Pink's chapter on symphony, he exclaims that in order for things to work and function well, designers and thinkers alike need to reflect about the problems at hand in a more holistic manor. According to Pink we need to be able to think about how all the parts of a problem relate to one another and how to think about creating solutions that not only solve the problem or task at hand, but can create harmonious outcomes with other elements involved in the project.

CLASSROOM STRATEGY AND PEDAGOGY

Though the major task has continued to be the same and the students have remained persistent on this assignment being a group project, some of the actual characteristics of the assignment have changed the past few times I have handed it out. It started off as an assignment based on actually creating a musical instrument out of found objects, recording them, and finally making a song. Because I found that the students were too involved in actually creating the object rather than the song, the end result suffered for it, and I had to make changes. Their songs ended up being more percussive in nature and less about the creation of a song with variation in tonality and pitch. The second time I gave this assignment I told the students that they were to design a song using the objects around them. This change in focus allowed the student to spend less time and energy on the creation of the actual instrument and more on the idea of synthesizing the sounds into a ballad of sorts. More recently, when I have handed out this assignment, I chose to give each group a title -- a color name. The assignment has become about how to convey the sound of color rather than just make sounds and or a melody for songs sake. I debated about other genres of direction to assign to each group, the sound of industry versus nature, what does light sound like, how do you make the sound of heavy…etc., but found that use of color gives the listener and the designer some semblance of ground to stand upon before embarking on their auditory journey. Regardless of which version of the assignment students were given, they were to create a song and or series of sounds that took into consideration the "ballad" as a whole. The students were to try and become cognizant of their sounds in relation to the other elements involved in the project.

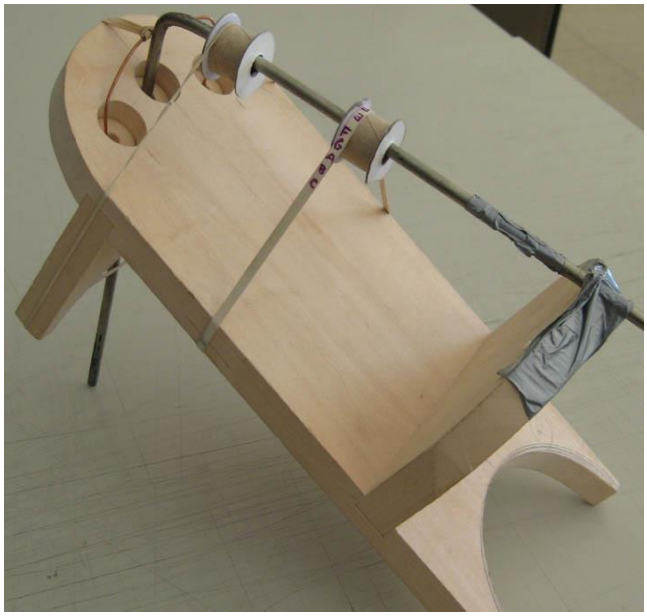


FIGURE 24

OUTCOMES

I realize that group assignments are not always the most enjoyable things for all students, but this assignment seems to create some "good vibes" for people. This assignment seems to warrant the collaboration of peoples' ideas more regularly than most group assignments. I think that this assignment can be given as a means to explore another side of the self. Like what Art does for people in relation to drawing and painting, this assignment allows someone who is not necessarily musically inclined to create something and attempt to convey a thought through a means that is sometimes scary or intimidating for people. The lack of actual instruments should enable students to create for the sake of creating rather than musical perfection. For those students who have musical talent already in the class, it allows them to explore a side of sound creation they may or may not have already seen. For those who are hesitant, being within the construct of a group will hopefully allow them to be more at ease about creating something that they feel they may have not talent at or in. Regardless, the dynamics of groups will always be different and in turn will create new sounds and songs. Each group seemed to like this assignment and in the end created nice little masterpieces that they should each be proud of.

WHICH CLASSROOM?

This assignment would be best suited for most classrooms. Music appreciation classes would be ideal, but I can definitely see this type of assignment given to any class that needs to explore an idea; perhaps a Tech class that is searching for a way to build a piece of furniture that is supposed to convey some sort of a feeling. If you create a situation in which the students are not allowed to use typical furniture building materials, then you can cause them to think about what else is out there and in-turn cause them to create a mini-furniture symphony. If you think about

this assignment as a way to break out of the confines of a study/subject then I think this assignment would work well for any classroom. After allowing the students minds to wander away from the topic at hand and struggle a little with a new means of creation, I found that they appreciate the traditional elements of whatever topic they are studying and will also try to incorporate their new findings with older ones. Each student learns to look at the relationship between the parts of the puzzle and the whole.

DESIGN ASSIGNMENTS –

ART IMPLEMENTATION

Light Up A Space

The understanding of materials is an integral part of creating thoughtful design. By acquiring an awareness of various materials, their physical properties, and their aesthetic capabilities, we gain an ability to comprehend their capability to enhance various characteristics as well as the appeal of an object. Materials come in various forms, some of which include fabrics, textiles, papers, plastics, woods, metals, etc. Becoming more conscious of materials physical abilities as well as their environmental, social, and economic impact allows people to choose, in a more intelligent manor, which materials are to be used in various design related problems.

CLASSROOM STRATEGY AND PEDAGOGY

This assignment came from a demand for students to have a hands-on interaction with materials – to explore and create. Not only was the assignment for them to create and explore, but in turn, become a thriftier eco-conscious student. The assignment was simply: "Light up a space". The only stipulation on the assignment was that it required of them to create their light objects primarily through the use of found objects. They were to explore various materials and create designs based on what their material dictated. The students were also encouraged to "dumpster dive" for all of their objects. I allowed for class time and went through various design intent drawings and ideation with each student. This style of design was different than what they had experienced before. Because they were repurposing the materials they had found, it presented a new type of design problem for each student. I reminded them that they are not always going to be able to create new objects. They are at times going to have to re-vamp existing designs using materials and processes that are not entirely new.

FIGURES 25-30

OUTCOMES

Although there were some students who tackled the assignment with great elegance, excitement, and ease, and even though I pushed for them to use all found objects, there were still multiple students who purchased chords and light bulbs to solve the problem. I accepted this as an inevitable and allowed for them to purchase these things, but nothing more. Some other draw backs were the amount of space and storage of their materials. They are all freshmen and with that type of territory come the task of either using their lockers or trudging them home to their dorm rooms.

Concerning their work, each student gathered different material from various places and in turn created a variety of "lights". Each of their works evoked a different feeling and addressed the problem in their own personal and distinct way.

WHICH CLASSROOM?

Because of the use of various found materials and possible electricity, a science and or technology based classroom would be the most ideal. It would be a great situation to discover various materials together and discuss them. It would also be a great opportunity to talk about electricity and various wiring and battery possibilities. Also due to the creative nature this assignment demands, I would not want to rule out the possibility of creating this assignment in an art based classroom either.

DESIGN ASSIGNMENTS –

PEOPLE PROBLEMS

Introduction

Along with other educational fundamentalists, John Dewey has become famous for his ideas behind education and experience. He believed that it is important to experience life in order to learn, that we must interact and use our abilities as social beings in order to gain the best understanding of a topic. Whether it is the sharing of ideas, a joke, or a situation, one of Dewey's main points was to create understanding through experiences with others. Dewey saw that because we are social beings, we need to interact with our settings and therefore must experience what we learn for maximum understanding and retention.

In the design world, experiencing what others feel and understand is one of many quests that a good designer embarks on. If a designer has the ability to truly understand what others need, then their designs become extremely valuable. Experiencing education with others as we grow allows people to gain a better understanding of other ideas, cultures, races, religions, and creates opportunities to learn from others and experience a side of life that we may not have the opportunity of exploring. Education through experience allows people to become more diverse in their understanding, hopefully leading them to not only become better designers and students but also better citizens in an ever-shrinking world.

The following are assignments were created to help foster a positive experience toward interpersonal relationships and utilize an understanding of one other to help create designs that are more meaningful, useful, and helpful for those whom the projects were created.

ASSIGNMENTS IN THIS SECTION:

Experience Experiment
Steve and Shelly

DESIGN ASSIGNMENTS –

PEOPLE PROBLEMS

The Experience Experiment

The intent of this assignment is to allow students to gain insight into another subculture. According to most people, in order to fully understand someone you must, as the saying goes, "walk a mile in their shoes". Though we will never truly become someone else, there are some ways in which we can attempt to understand one another. Studying, learning, and experiencing other cultures, people, and ideas not only broadens our understanding, it also allows us to become better citizens of the world.

CLASSROOM STRATEGY & PEDAGOGY

This assignment was dubbed the experience experiment. We discussed different subcultures in society that they felt were of important note. After some discussion about various subcultures and problems that seem to exist on campus groups were created. We decided on an obese demographic, a deaf demographic, a visually impaired demographic, a children demographic, and an elderly demographic. The class was then broken up into groups consisting of three to four students. Each of the groups had to try and "experience" the assigned subculture in any means necessary. They were to document their findings and report to class about what they found through means of video, slideshow, or photo documentation. They had to become that subculture for at least a day, going through their daily lives in an attempt to discover situations that warranted design attention. Through their documentation and experiences they were to then pick a problem that they encountered and design a solution. Due to the groups sizes they were to present their final products in multiple mediums (i.e. models, slide shows, sketch ideas, and renderings).

FIGURES 31-22

OUTCOMES

Because of the scope of this assignment, it took the students three weeks to complete. We broke it up into thirds. The first week was experiencing and presenting how they came to consider the products the students wished to

redesign. The second week was to create rough ideas about the problems being solved. The third week was to finalize and present their solutions.

The assignment had great results, allowing students to create an understanding of different subcultures and discover beneficial ways to solve problems discovered within them. The assignment gave each student a better understanding regarding those they were designing for and to take into consideration other peoples issues when it comes to design choices.

WHICH CLASSROOM?

This assignment could be given in most every classroom. From a math teacher discussing the geometry of a building, and having the students act like their favorite architect, to a history teacher discussing the civil war and in turn having their students act out key roles; the attempt in experiencing others, alive or not, allows us to comprehend and retain information in ways that are unlike any book we pick up.

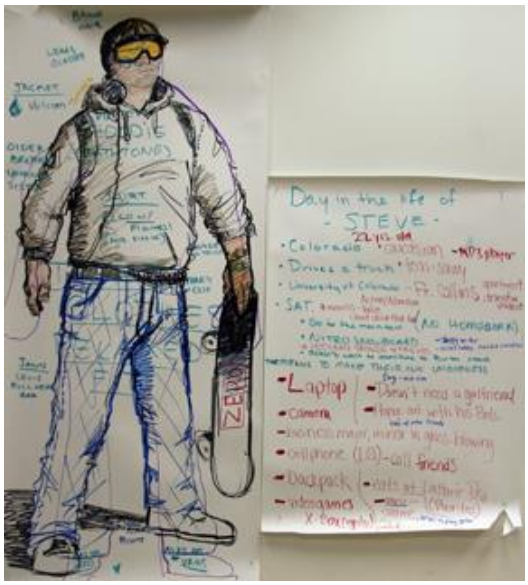
DESIGN ASSIGNMENTS –

PEOPLE PROBLEMS

Steve and Shelly

The objective of this design assignment is to create better, more powerful, and purpose driven designs through an understanding of people. Designers need to understand their perspective clientele and tag-teaming ideas with marketing like strategies create more in-depth design approaches. By creating a demographic and persona the accompanying assignment is well rounded and allots for better design depth. This assignment aimed to give students a better understanding of not only how to design better, but who they truly are designing for.

CLASSROOM STRATEGY & PEDAGOGY



FIGURES 33-34

During the spring quarter at RIT, students were given a design assignment based on winter action sports. Snowboarding, because of the 2008 Olympics, became the topic regarding what to design. They had the freedom to design whatever they desired, with one stipulation -- They were to create personas based on research and characteristics revolving around the winter sports industry. Through their research "Steve and Shelly" were created. "Steve and Shelly" came about by means of current market trends and knowledge of what a person whose hobbies include snowboarding would be like. During the creation of "Steve and Shelly" it was interesting to hear what each of the student had to say. They went from discussing what he owned to creating a personality for him based on things that were not tangible. The students gradually started to create personalities. "Steve" became a middle child, a student at a community college, and a part-time worker at a grocery store, leading to the conclusion that "Steve" probably didn't go to the mountain very often. "Shelly" on the other hand was an employee at a local mountain, an only child, and was a much more adapt snowboarder. After creating the list of what defined "Steve and Shelly",

they started on the task of drawing their newly developed people. They needed to be able to see whom they had so diligently defined. The characteristics developed by the class gave a 3D perspective about a 2D person they had just created. This additional information created helped to show students not only a glimpse into marketing, but also that the people they design for are not just cookie cutter consumers, but people of substance, and that their designs need to be influenced by them.

They enjoyed the project and seemed to be ok with their homework, which was to do more research, but this time as "Steve and Shelly". I encouraged them to try and grasp a better understanding about what "it" is that they would purchase and also think about why they would purchase a particular product. They were to then take what they have found and create a mini-presentation on what "Steve and Shelly's" life entailed over the next week (i.e. where they went during the week, what they ate, who they hung-out with, and what products they interacted with.) The class ultimately chose objects that they felt best represented either "Steve" or "Shelly" and redesigned them to better account for the demographic and under lying marketing strategy developed in class.

We created a grid system to help delegate products and design techniques for each:

	Boots	Bindings	Clothing
Drawing			
Modeling			
Computer			





FIGURES 35-41

After creating "Steve and Shelly" their assignment was to create product based on their persons interests.

Some students designed back packs more adapted for snowboarders, some created clothing, others helmets, but there were some objects that students designed that they tried to create to tap into "Steve and Shelly's" other sides not just their "stuff".

OUTCOMES

"Shelly's" character came about because of the ladies in the class. Since the focus was on snowboarding, a typically male dominated sport, the women in the class decided that the female perspective would be a necessity. So, for the spring quarter during the freshman elective class, "Steve and Shelly" were created. "Shelly's" involvement in the class helped give more of a female flair, and created a person/persona they could relate to and create for. Exploring who "Steve and Shelly" were became a good exercise for the students, not only did it give them more insight into various demographics, but because they created these "people" there was no discrepancy about whom they were designing for. It allowed the students to reflect on themselves and ask important questions regarding design and whom they were really creating designs for.

WHICH CLASSROOM?

Since marketing and demographics are used heavily throughout this assignment, the assignment would be ideal for a business class or technology class. The business class could look at this assignment from more of a theoretical/psychological approach, while the technology class could attack this assignment from a marketing angle. Regardless, the development of a persona is a good lesson in self-reflection especially from an ethical and moral viewpoint regarding what it means to be a consumer in the 21st century.

DESIGN ASSIGNMENTS –

MANUFACTURING

Introduction

The study and "manufacturing" of goods in relation to design can be created by investigation of just a single simple material or the creation of an object such as the one discussed herein. The discussions, ideas, and general methods of manufacturing can be created through a much simpler means than discussed in this assignment. From creating a boat with paper to fabricating a light made out of only milk jugs, the means for solid discussion regarding fabrication and manufacturing exists in most anything. I chose to create snowboards because of my passion for riding and the resources I had at hand.

ASSIGNMENTS IN THIS SECTION:

Snowboard Manufacturing

DESIGN ASSIGNMENTS –

MANUFACTURING

Snowboard Project

Production, fabrication, and manufacturing are necessary components to design. Without the creation of ideas they never truly come to life. More specifically, Industrial Design tends to think more in terms of production – how it's made, where the resources come from, cost, tooling involved, materials, etc. Having training in fabrication techniques, a pool of resources (tools, shop, space), some mathematical and engineering knowledge, and the desire to search for answers are all things necessary to embark on a project of this magnitude. This section is actually better named a "project" due to the size and scope of the work. There are many areas for "assignments" within the projects entirety. Though there is discussion about where to locate materials and basic fabrication techniques here within, for the sake of this document, I decided to ball things into one assignment based on the fabrication of two snowboards.

Before I got into thinking about how to design snowboards in a classroom, I fell upon a site named CreateAskate.org. This organization is nothing more than a gentleman following his heart and dedicated to a sport that has given him so much. Founder, Paul Schmitt took skateboarding and moved his passion into the classroom. He created a program that showed children not only how to make a skateboard and give them more insight into the sport, but also show them how to have respect and understanding for the design, fabrication, and manufacturing of skateboards.

CreateAskate.org's Founder, Paul Schmitt, owns and operates the largest and most successful skateboard manufacturing company in the United States. For nearly three decades Schmitt's company has been considered the innovative leader in design and manufacturing of the highest quality skateboards for skateboarders around the world. In fact, Schmitt is considered by many within the billion-dollar skateboard industry to be the 'Godfather' of modern-day skateboard deck manufacturing. His reputation has earned him the apropos nickname, "Professor Schmitt."

FIGURE 42

Having the opportunity to teach in winter season of upstate New York instead of southern California, I decided to create a program of similar mindset but with a snowy twist -- I decide to make snowboards.

This project started as an interest of mine during the summer before my second year at graduate school. I started looking into snowboard manufacturing on the Internet – websites like Grafsnowboards.com, snowboardmaterials.com, skibuilders.com, and various other DIY sites helped me find out bits of information to aide in discovering a process of creating a snowboard that would be suited for a classroom.

I also tried to contact a few snowboard manufacturing places and board shops to help me in my quest. Never Summer Snowboards, located in Denver Colorado, helped me tremendously on my journey by answering some of the more technical questions regarding pressing pressure and epoxies. They were also very encouraging in creating, designing, and manufacturing of the snowboards as something to be taught in a classroom.
As mentioned before, this journey started by looking at websites and taking passion for a sport and putting it in a classroom setting. Snowboardmaterials.com had everything on their site including cores, edges, plastics, steel, carbon fiber, fiberglass, epoxy, and inserts; all the things needed to start making a board. Around this time I also met an undergraduate named Andrew Pohl. He heard that I was going to be trying to make snowboards and wanted to help me out on the project. He had been snowboarding for a few years and had the drive to design and investigate. He eventually became my partner throughout the project and collaborated on various graphics, possible board constructions, references for materials, and construction techniques. It took several phone calls, emails, weeks, and hours of investigation to be able to hunt down the various materials needed to be able to create the snowboards on a scale that was cost effective. So, after several trials with the mold making and pressing process, starting with a simple vacuum press and ending with a steel clamshell bladder press, I began to embark on how my classroom would partake in this process.

CLASSROOM STRATEGY & PEDAGOGY

Because of the scope of this project, combined with the quarter system that RIT functions within, there is a lot of preparation to be made in order to make this project a success within a classroom time frame. Multiple designs, fabrication techniques, proper assembly order, and mechanical testing must be completed before this project could be well implemented into the classroom.

FIGURE 43

In order to make this project work well multiple aspects of the manufacturing process must be investigated.

MOLD

The mold is the part of the manufacturing process that allows the board to take its shape. The mold can be completed by cutting sections of MDF (medium density fiberboard) or dense plywood into subsections of the entire mold and gluing them together. By searching websites like grafsnowboards.com as a reference, creating a mold that suite various size snowboards and shapes should be fairly easy. Snowboards can take various sizes and shapes. Use your imagination; it can go a long way.

METAL TEMPLATES

Templates are needed to trace and cut out the bases and cores for the boards. The base plastic and core needs to be a certain shape, length, and width. I used the snowboard that I traced for the mold as a reference for the base. Laser cut steel makes a great reusable template for the cores. By creating a snowboard layout in a CAD program, an easier transfer of information to various places for laser cutting may be accomplished. The template for the wooden core needs to be small enough to allow the wooden core, once cut to shape, to be encased in plastic, or the sidewalls.

FIGURE 44

FIGURE 45

PLASTICS

The plastics used in snowboards are typically UHMPE (Ultra High Molecular Poly Ethylene). These plastics are highly resilient to temperature and humidity changes. Searching for materials locally may be a good option to support local business and cut costs for this project. The biggest supplier of this type of material is located in Ohio. Crown Plastics supplies to Burton and many other large snowboard manufacturing businesses. Ordering of these specific materials may need to be done in quantities that are large than one board at a time. Factoring in time and shipping for the plastics should also be taken into consideration before beginning the project/assignment.

CORES

FIGURE 46

The cores of snowboards have been constructed of various materials throughout the history of snowboarding. For the sake of the assignment, creating the cores in wood is the most cost effective and available material. Through the investigation of websites for snowboard manufacturers and other DIY individuals, they showed cores that were mostly made of medium hard woods. Poplars, Ash, Beech, Birch all have the best characteristics of what snowboards need, elastic capabilities and ridged spring-back.

EDGES

FIGURE 47

Edges pose the most problem. All edges for snowboards are steel and are very difficult to procure locally. Finding a manufacturer of snowboard and ski edges is a very difficult task. Most manufacturers of edges are overseas and very costly. Distributors of edges are more readily available and less expensive. Skibuilders.com is an aftermarket website that sells precut edges and is a great resource for other goods as well. The edges need to be applied to the template-cut plastic bases through the means of bending and tacking the edges with superglue. Pliers and clamps help to bend and secure the edges, making sure that pressure stays on and allows the glue to dry before final assembly.

INSERTS

The inserts are constructed from alloyed metal, are milled to take a 7mm screw, and are the parts that attach the board to the bindings. The inserts are placed into the board's core and can be covered with a magnetic plate that seals the threads from the epoxy used during lay-up. The magnetic seal allows for them to be located post assembly by sprinkling metal filings on the board and drilling through the top layer to the insert underneath.

FIGURE 48

FIBERGLASS

Fiberglass is measured in ounces, the heavier the ounce, the thicker the glass and thus creating a stronger board.
Weave also plays a factor in strength. Fiberglass can be woven in various directions and should be taken into consideration when
it comes to the type of flexibility desired from the board. The average weight and weave of ski and snowboard fiberglass is 16-20 oz. tri-axle. Fiberglass can be found in rolls at most any boating shop and online.

FIGURE 49

EPOXY

Snowboards have to be slathered with epoxy between each layer, fixture, then held together under pressure to make for good adhesion. Heat is also something that can be a factor when dealing with epoxy systems. As heat increases, there is typically a decrease in time. There are a number of formulations of epoxy that can be purchased through various vendors. The most common epoxy found in consumer markets comes from West System Epoxy, a leader in the boating industry. Though the core and fiberglass creates the rigidity of the board, epoxy can also be a factor in stiffness and brittleness. Rhino Linings also creates an epoxy system that is more pliable after the curing process is complete to allow for a more malleable board.

PRESSING

The easiest and most immediate choice for a press is a vacuum bag. A vacuum bag works well enough to hold the board together, is fairly inexpensive to purchase, and can be used for multiple projects, but a vacuum does not create enough pressure to properly compress the material during the press cycle. A vacuum only holds pressure to around 14 psi and typically has a difficult time holding consistent pressure. Because of the problems inherent with the vacuum, the decision to make a mold that involved a press became evident.

FIGURE 50

A clamshell press was designed and fabricated out of 10-gauge steel and allows the user to open and close the press like a suitcase. It encased the molds and allows the user to place the materials needed into the mold before closing the lid. The pressing apparatus itself was contrived from three fire hoses clamped off and sealed so that air can be forced in and pressure be attained – a bladder press. Pressure needed to create a solid, bubble-free, board varies between 48,000 and 60,000 foot-pounds of pressure depending on the size of the board being assembled. Dividing the foot-pound desired by the boards surface area should determine how many pounds per square inch is needed during the press cycle. Holding this amount of pressure for the amount of time epoxy takes to air set can be problematic. A heating element such as silicone mats are often introduced to cut down the curing time and eliminate potential pressure related issues based on time.

FIGURES 51-53

OUTCOMES

Due to the scope of this project, it should be a yearlong learning experience for both the instructor and the students. Though this is a project-based learning exercise, it would have been more beneficial for students to be able to learn through a means of guided discovery and individually motivated learning; that way the students could have gone through the fabrication processes involved in creating the mold and board components from scratch, as well as researching and discovering methods and materials.

This project takes commitment. Many hours must be done researching and creating for class activities, construction, and discussions. Teachers who decide to use this type of method should look at this project as a means to discuss contemporary design issues regarding manufacturing and fabrication techniques. The discussions revolving around this type of project truly allow students to relate quickly and become engaged in problems or issues that could influence the outcome of the project. Giving students the advantage of knowing how things are made, creating tangible objects, and discussing design problems/issues allows them to become more knowledgeable of the world that surrounds them.

WHICH CLASSROOM?

I feel that manufacturing is something vital to the production and creation of great design. Without a solid understanding of processes, materials, and product lifecycle a design suffers. This project would tend to lean itself toward a multi-disciplinary classroom with a technology, math, and science at the helm. Though there is plenty of art and visually intriguing investigations and discussions, science and the physics behind pressures and materials are at the root of this project. Teaming other assignments mentioned earlier in this document with this project and tailoring them to reflect snowboard related ideas and understanding might be something that students find very interesting as well as the ability to build something that they can use and experience.

CONCLUSION –
A NEW CLASSROOM

Throughout the creation of these various assignments I have come to realize the complexity of educating. Challenges exist not only because of various learning styles within students and educator alike, but because of larger issues concerning facilities, resources and demographics. I do however believe that Design, the process of and interaction with, can level the playing field when it comes to education. Design in its various forms can be something that all people can share in. We act and react within its confines daily. It is my belief that Educating through the process of Design will allow people to think critically and responsibly, aiming for a goal that positively benefits society.

As educators, creating assignments to challenge your students may be challenging in itself. If the "red-tape" allows, use these assignments as guides for you to better yourself and challenge the way people think. It is my hope that through the implementation of these types of assignments and projects that a new understanding of life through educational changes can be made; an understanding of how to create an enriching nurturing and enlightening education for students through the use of Design Based Learning – creating interconnectedness by means of communication, discussions, research, materials, semiotics, music, manufacturing, and exploration.

REFERENCES

Books:

Braungart, Michael and William McDonough. 2002. "Cradle to Cradle: Remaking the Way We Make Things" Macmillan: New York.

Buermeyer, Laurence Ladd. 1929. "The Aesthetic Experience" Barnes Foundation Press: Philadelphia.

Dewey, John. 1969. "Art and Education" The Barnes Foundation Press: Philadelphia.

Gropius, Walter. 1954. "Scope of Total Architecture." Harper & Brothers Publishers: New York.

Gardener, Howard. 1983. "Frames of Mind: The Theory of Multiple Intelligences." Basic Books: New York.

Pink, Daniel. 2005. "A Brand New Mind: Why Right Brainers Will Rule the World." Riverhead Books: New York.

Schön, Donald A. 1983. "The Reflective Practitioner: How Professionals Think in Action." Basic Books: New York.

Waks, Leonard J. 2001. "Donald Schon's Philosophy of Design and Design Education." Kluwer Academic Publishers: Germany.

Wick, Rainer K. 2000. "Teaching at the Bauhaus." Distributed Art Pub Incorporated: New York.

Articles:

Knight, Christopher. 2012. "Frank O. Gehry: Sketches." Arcspace, September 07. Accessed February, 2009. http://www.arcspace.com/the-architects-studio/frank-o-gehry-sketches/.

Websites:

Charter High School For Architecture and Design. "Mission Statement – CHAD Website." Chadphila.org. http://www.chadphila.org/ (accessed May, 2009).

Create-a-skate. "About Us." Creataskate.org. http://www.createaskate.org/about_who.php (accessed Sept, 2009).

Rochester Institute of Technology. "Welcome Statement - CIAS Design Website." Rit.edu. https://cias.rit.edu/schools/design (accessed March, 2014).

School Wires, Inc. “Vision Statement - School Without Walls Website.” Rcsdk12.org. *http://www.rcsdk12.org/Page/19682* (accessed May 2009).